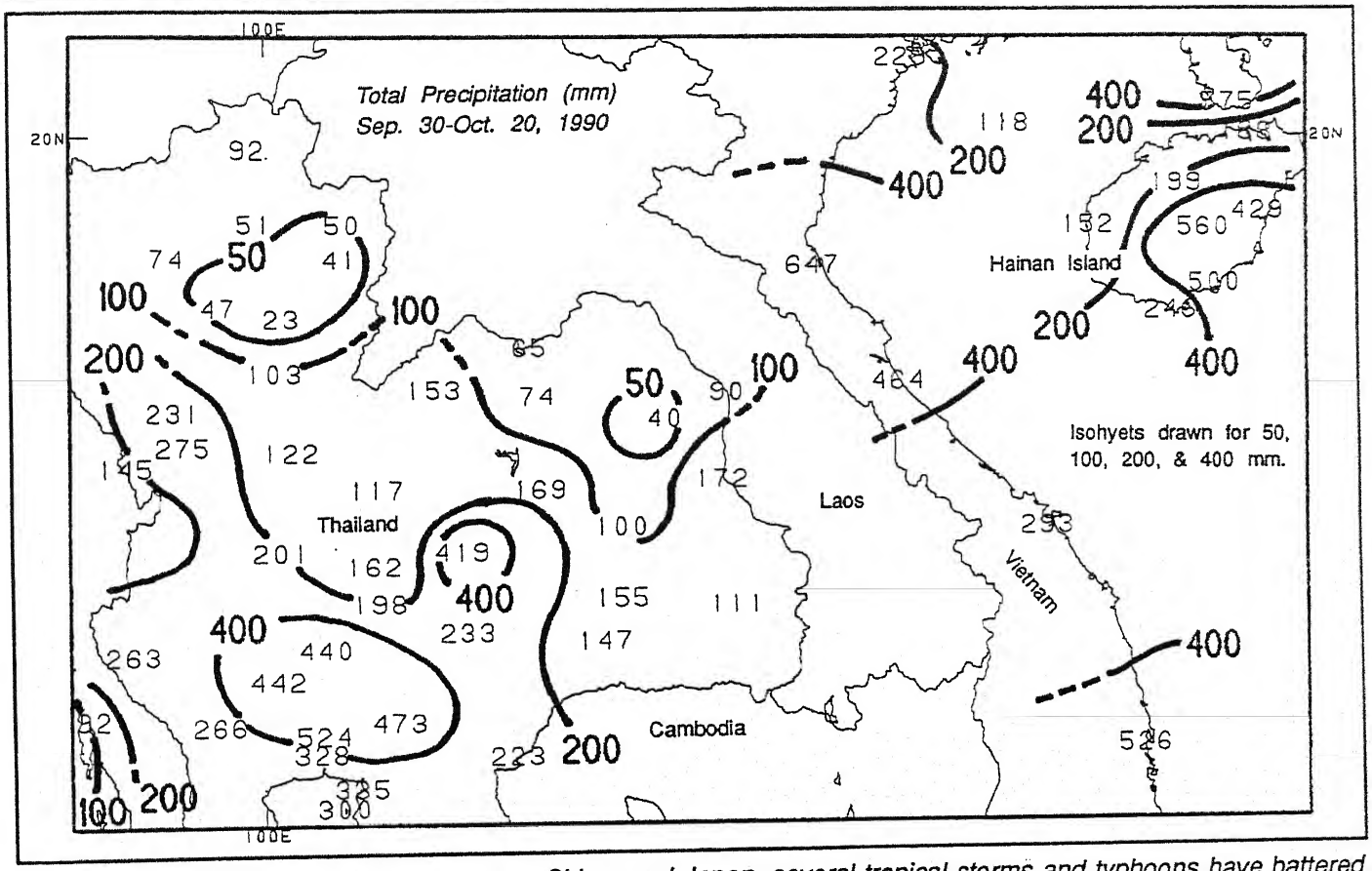
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 90/42 **Washington, DC** **October 20, 1990**



Similar to the Philippines, Taiwan, eastern China, and Japan, several tropical storms and typhoons have battered China's Hainan Island and Southeast Asia this year, generating strong winds and torrential downpours that have caused severe and widespread property and agricultural damages. From late August into mid–September, Typhoons Becky and Ed dumped heavy rains on much of the region, producing extensive damage in Vietnam, Laos, Cambodia, and Thailand, according to press reports. In October, moisture from Tropical Storms Ira, Jeana, and Lola triggered flash flooding in Thailand and Vietnam as over 400 mm of rain, much of it falling within a short–time period, inundated parts of the region. Reports stated that dozens of people perished, thousands were left homeless, and flood waters caused widespread damage to crops.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE–NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two–week temperature anomalies.*
- *Global four–week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three–month precipitation anomalies (once a month).*
- *Global twelve–month precipitation anomalies (every three months).*
- *Global three–month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 25, 1992

1. Western Canada:

UNUSUALLY MILD WEATHER CONTINUES.

Temperatures averaged as much as 13°C above normal as unseasonably mild marine air again dominated the region [7 weeks].

2. Northwestern United States:

MOISTURE DEFICITS DEVELOP.

Although as much as 220 mm of rain inundated western Washington, little precipitation has fallen across much of the area from northern California to western Montana [4 weeks].

3. Southern United States and Northern Mexico:

MORE WET WEATHER.

Unusually strong high level winds continued to usher copious amounts of moisture into the region. Parts of the region received over 60 mm of rain last week, with isolated totals reaching 145 mm, according to River Forecast Center reports. The heavy precipitation aggravated existing flooding or caused renewed flooding in a few areas along the Gulf Coast while some rivers remained out of their banks due to previous heavy rain [15 weeks].

4. East-Central South America:

HIGHLY VARIABLE PRECIPITATION.

Much of northern Argentina remained unusually wet, with 30 to 80 mm of rain soaking extreme northern and western areas [9 weeks]. In sharp contrast, only 10 to 20 mm fell in southern Brazil and adjacent Argentina and Paraguay, where abnormally dry conditions have developed during the past month [4 weeks].

5. Europe and the Middle East:

DRYNESS SPREADS.

Less than 20 mm of precipitation fell throughout the area, allowing moisture shortages to develop across much of northern and central Europe [4 weeks] but bringing ar to unusually wet conditions in the Middle East [Ended weeks].

6. Turkey:

COLD POCKETS REMAIN.

Near normal temperatures returned to much of nor Africa and the Middle East; however, pockets of weather remained in parts of Turkey, where w temperature departures dipped as low as -10°C [9 week

7. Southern Africa:

COPIOUS RAINS BRING RELIEF.

Up to 120 mm of rain drenched the area, easing short- moisture deficits, although longer-term precipit shortfalls date back to the beginning of the rainy seas many locations [Ending at 7 weeks].

8. Philippines and Northern Borneo:

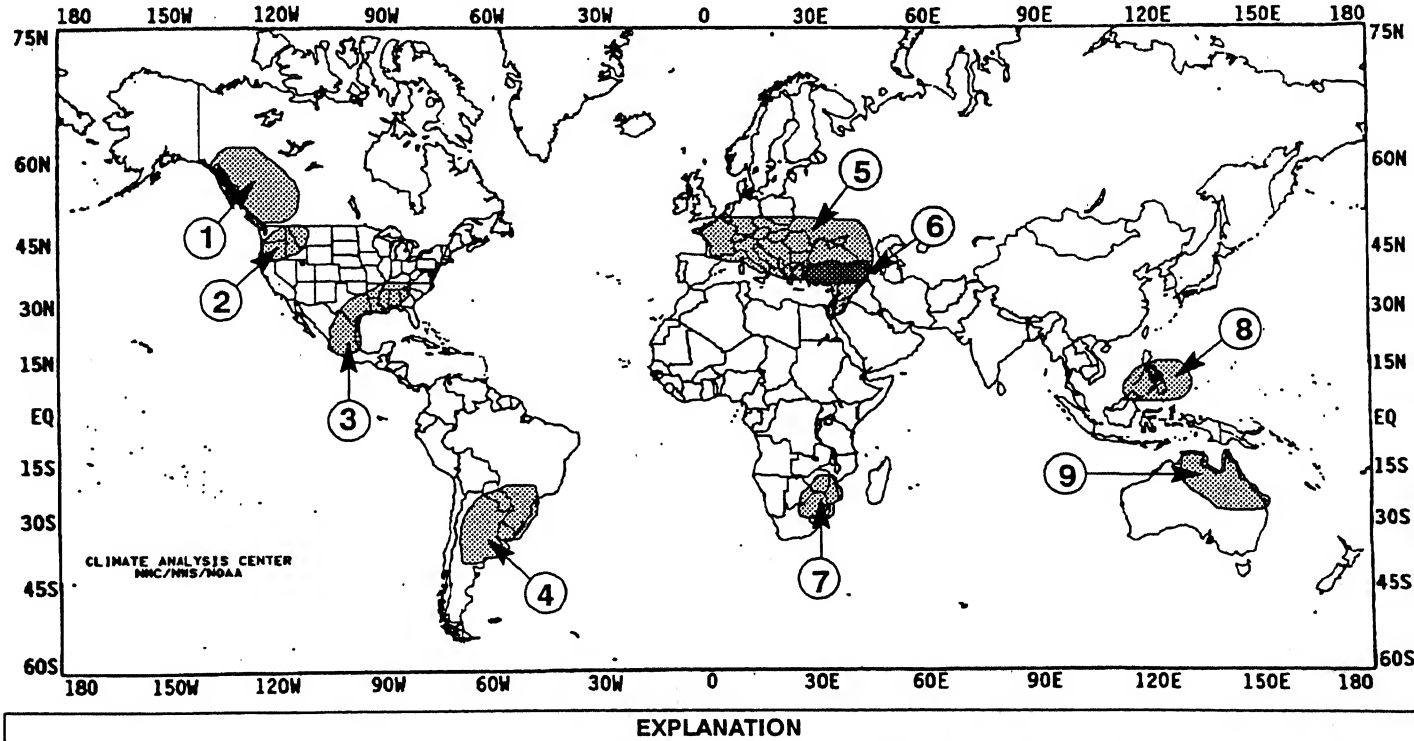
DEFICIENT RAINFALL OBSERVED.

Most locations in the tropical western Pacific depen frequent afternoon thundershowers for their rain; how less than 20 mm of rain was measured last week as ty convective activity remained suppressed. [4 weeks].

9. Northern and Eastern Australia:

VERY DRY WEATHER REMAINS ENTRENCHED.

Little or no precipitation was again reported as unusuall weather persisted. Since early December, many loca have measured 100 to 265 mm less than normal rainf weeks]. Temperatures up to 6°C above normal aggra the parched conditions [3 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JANUARY 19–25, 1992

Wintry weather dominated the northeastern quarter of the nation while spring-like thunderstorms pounded the Deep South. A series of "Alberta Clippers" raced southeastward out of south-central Canada, spreading heavy snow from the northern Plains to the mid-Atlantic. Storms dumped more than half a foot of snow from Minnesota to Maryland on Friday and Saturday. Arctic air continued to plunge southward out of Canada, combining with strong wind gusts to produce dangerous wind chills from the upper Midwest to the Northeast. The mercury plunged to a record daily low of -32°F at Mount Washington, NH Sunday morning. Strong wind gusts accompanied the bitter cold, producing wind chills of -100°F. Lake effect snow squalls buried portions of the Great Lakes on Sunday and Monday, with more than a foot of snow measured in parts of Michigan and New York. Sub-zero readings were reported from the Dakotas to western New England. A wintry mixture of precipitation affected much of New England on Thursday, temporarily forcing the closure of Boston's Logan International Airport because of icy conditions, according to press reports. Elsewhere, strong thunderstorms raked portions of the South, accompanied by heavy rain and strong wind gusts. Flash flooding was reported in Louisiana and Mississippi while wind gusts damaged trees and homes in South Carolina and Georgia. Elsewhere, unseasonably warm weather prevailed from the central Plains to the northern Rockies. Record daily highs were established from Nebraska to Montana as readings soared into the fifties, which is more than 20°F above normal. Meanwhile, strong winds buffeted the northern and central Rockies on Friday. Wind gusts over 100 mph were reported in Colorado and strong gusts also battered portions of Montana and Wyoming. Farther west, heavy rain soaked parts of western Washington and southeastern Alaska with over 8 inches at Quillayute, WA and 5 inches at Yakutat, AK, while moisture shortages increased across the rest of the northwestern quarter of the nation (Figure 1.)

The week began with heavy lake-effect snow squalls in the Great Lakes and western New England. Syracuse, NY was buried under 21.5" inches of snow. Frigid conditions prevailed across much of the eastern half of the nation, with sub-freezing temperatures observed as far south as the central Gulf Coast and the northern half of Florida. Meanwhile, a low in south-central Canada dropped into the northern Plains and sped eastward, spreading more snow across the Great Lakes and Northeast. Farther west, a developing storm in the south-central High Plains triggered thunderstorms in Oklahoma and Texas on Tuesday. Warm air ahead of the system pushed northward, producing daily record highs in Iowa and Nebraska as readings topped 50°F. A dome of high pressure yielded relatively tranquil weather across most of the western U.S.

During the latter half of the week, yet another storm in south-central Canada pushed eastward while the trailing cold front popped into the nation's midsection. The low in the central High Plains and a second area of low pressure in the lower Mississippi Valley eventually merged with the front as it progressed eastward, triggering snow across the northern Plains and upper Midwest while thunderstorms broke out in the Deep South. Nearly 4 inches of rain inundated Lafayette, LA, on Wednesday, causing flash floods. As the front moved eastward, thunderstorms packing damaging wind gusts pounded the Southeast while heavy snow fell from the Great Lakes to the central Appalachians. A wintry mixture of precipitation glazed roads in northern and central New England on Thursday. Toward the weekend, the next in a series of storms to move out of south-central Canada dropped into the northern Plains. This storm system raced southeastward, depositing moderate to heavy snow from the northern Plains to the mid-Atlantic. Parts of western Maryland received up to 8 inches of snow while 4 inches blanketed the Washington, DC. and Baltimore, MD vicinities. Arctic air remained entrenched in the Great Lakes and Northeast, and strong wind gusts produced bitter wind chills. In sharp contrast, relatively mild and tranquil conditions prevailed in the western U.S., with nearly half a dozen record daily highs established on Saturday in Montana, Idaho and Oregon.

According to the River Forecast Centers, the greatest weekly precipitation totals (more than 2 inches) fell in a band from southern Louisiana northeastward to southwestern Virginia, across northern Florida, through the central Appalachians, along the north Atlantic coast, in the western half of Washington, and across extreme southeastern Alaska (Table 1). Light to moderate precipitation was measured across New England, the Great Lakes, the mid-Atlantic, the Ohio Valley, the remainder of the Deep South, the lower three-fourths of the Mississippi Valley, eastern portions of the central and southern Plains, the central Rockies, the Southwest, the northern half of the Pacific Coast, the Aleutians, and eastern Hawaii. Little or no precipitation fell on the remainder of the Mississippi Valley, the northern and western Great Plains, the northern Rockies, the Great Basin, eastern Oregon, the southern two-thirds of California, and the remainders of Alaska and Hawaii.

Abnormal warmth enveloped a large portion of the northern and central U.S., Pacific Northwest, Southwest and Great Basin. (Table 2). For the seventh consecutive week, unusually mild weather dominated eastern Montana, the Dakotas, and Nebraska with weekly departures reaching +16°F to +23°F as readings at several locations approached 60°F. Departures between +5°F and +15°F were common from the Pacific Northwest southeastward to the middle Mississippi Valley. In Alaska, unusually mild conditions prevailed across much of the state again this week, with the greatest weekly departures of +8°F to +17°F recorded in the east.

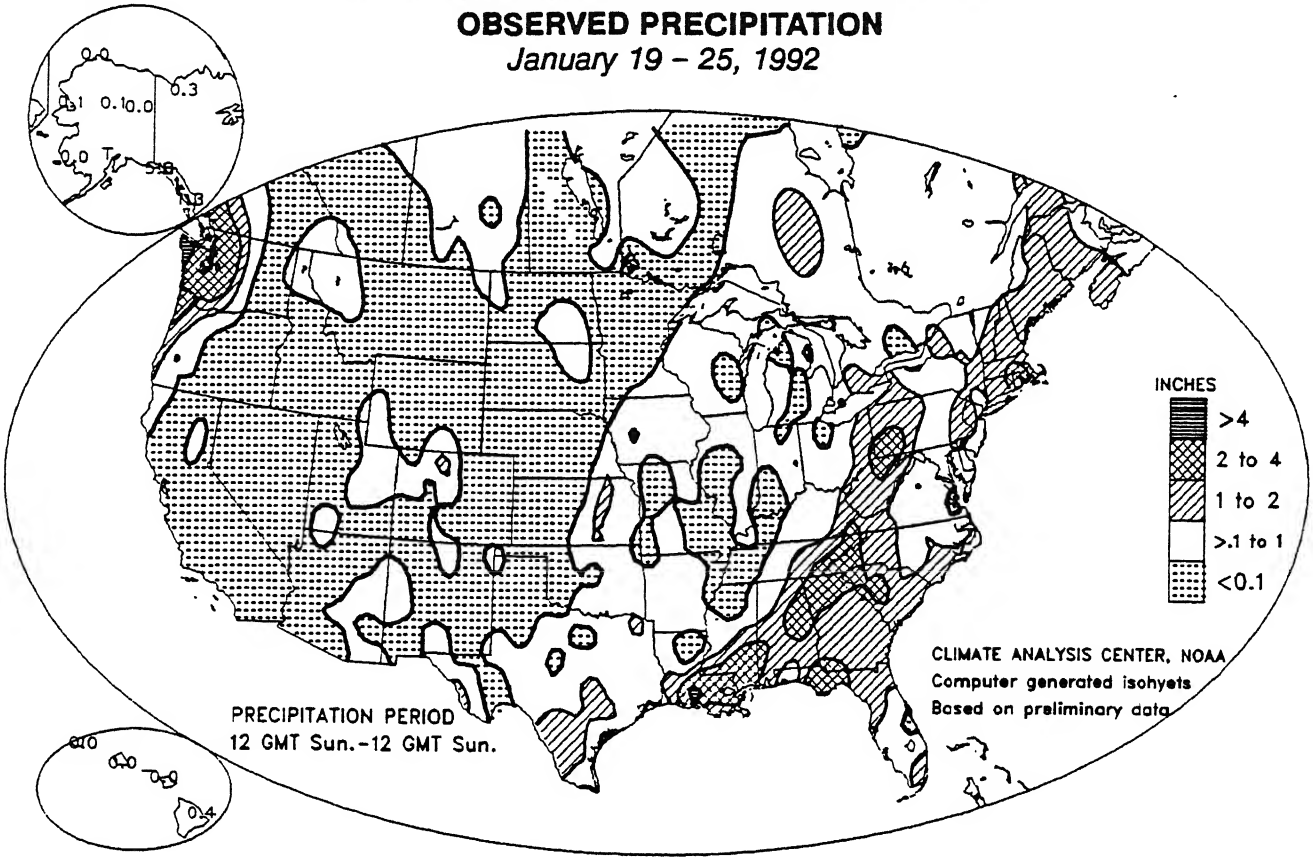
Abnormally cold weather was confined to the eastern Great Lakes, the Atlantic coast, the Gulf Coast, the southern and central Rockies, and the northern two-thirds of California (Table 3). Weekly departures between -5°F and -10°F were recorded in northern New England, northern Florida, southern Georgia and Alabama, and California. Cooler than normal conditions were also observed across south-central, extreme southwestern and northwestern Alaska, where weekly departures reached as low as -5°F.

TABLE 1. ***SELECTED STATIONS WITH 2.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF JANUARY 19 - 25, 1992***

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
QUILLAYUTE, WA	8.82	PROVIDENCE, RI	2.35
LAFAYETTE, LA	6.88	NEW ORLEANS/MOISANT, LA	2.27
YAKUTAT, AK	5.75	SITKA, AK	2.23
STAMPEDE PASS, WA	3.23	NEW ORLEANS/LAKEFRONT, LA	2.22
PANAMA CITY/TYNDALL AFB, FL	3.13	ATLANTA/C BROWN, GA	2.11
APALACHICOLA, FL	2.88	BRUNSWICK NAS, ME	2.05
TALLAHASSEE, FL	2.84	VALDOSTA, GA	2.03
OLYMPIA, WA	2.42		

OBSERVED PRECIPITATION

January 19 – 25, 1992



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

January 19 – 25, 1992

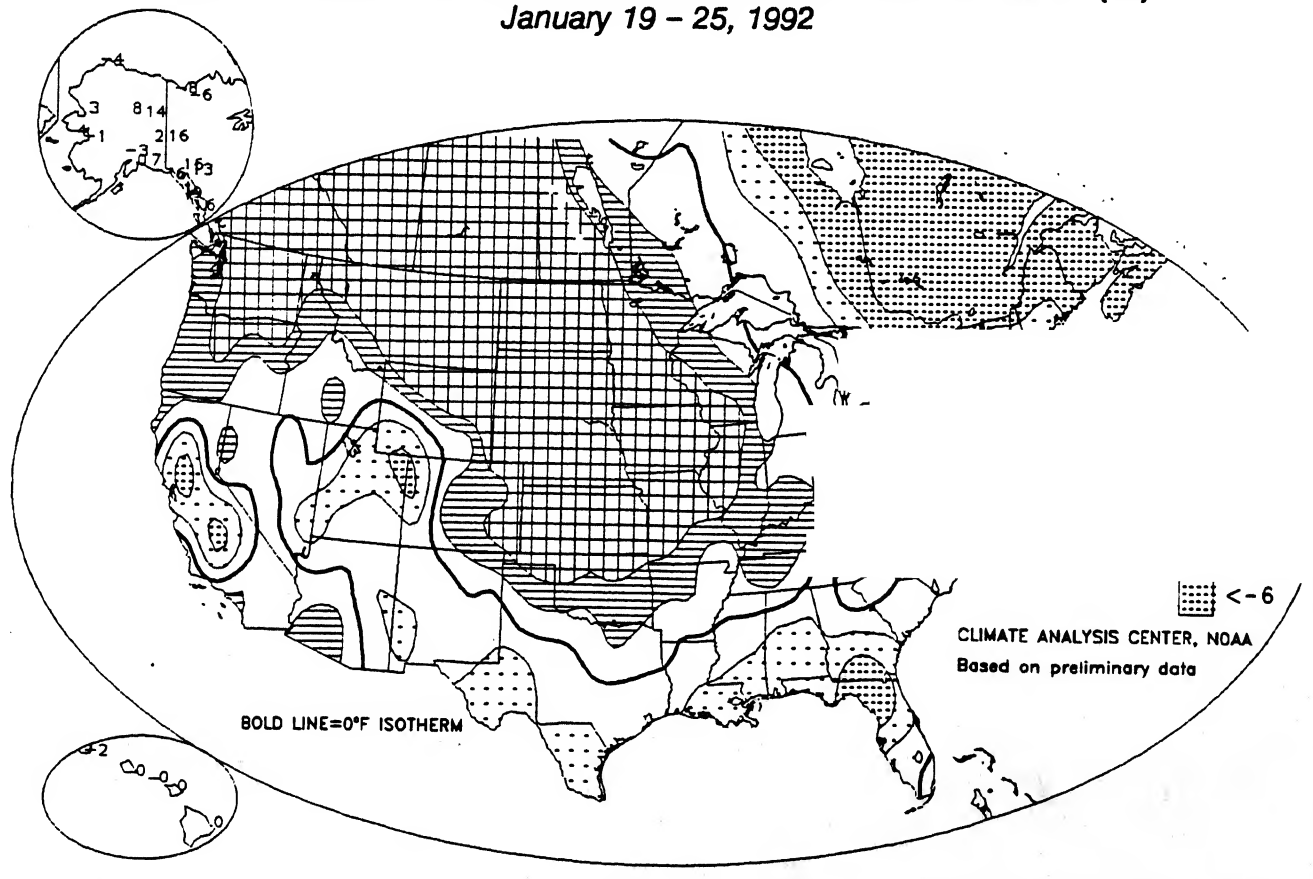


TABLE 2. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 14.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF JANUARY 19 - 25, 1992*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MILES CITY, MT	+23.3	37.2	LINCOLN, NE	+16.1	35.6
HAVRE, MT	+22.7	34.5	WILLISTON, ND	+15.9	22.6
GLASGOW, MT	+22.2	30.1	PIERRE, SD	+15.7	30.5
CUT BANK, MT	+20.9	35.3	MINOT, ND	+15.7	21.5
DICKINSON, ND	+19.0	29.5	LEWISTOWN, MT	+15.3	33.2
NORFOLK, NE	+18.1	35.4	SHERIDAN, WY	+15.2	35.1
RAPID CITY, SD	+17.7	38.5	SIOUX FALLS, SD	+14.7	26.9
BISMARCK, ND	+17.5	23.8	HURON, SD	+14.6	25.4
GRAND ISLAND, NE	+17.4	38.0	OMAHA/EPPLEY, NE	+14.5	34.3
BILLINGS, MT	+17.3	38.4	NORTH OMAHA, NE	+14.3	34.4
GREAT FALLS, MT	+17.2	36.6	FT YUKON, AK	+14.2	-5.3
NORTHWAY, AK	+16.5	-4.3	JAMESTOWN, ND	+14.1	19.0
SIOUX CITY, IA	+16.4	32.4	CONCORDIA, KS	+14.0	39.3

TABLE 3. *SELECTED STATIONS WITH TEMPERATURES AVERAGING 6.0°F OR MORE BELOW NORMAL FOR THE WEEK OF JANUARY 19 - 25, 1992*

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ALAMOSA, CO	-16.9	-0.9	STOCKTON, CA	-7.6	38.1
MT WASHINGTON, NH	-9.7	-5.0	HOULTON, ME	-7.5	4.9
GAINESVILLE, FL	-9.0	48.9	SACRAMENTO, CA	-7.2	38.6
EASTPORT, ME	-8.8	13.9	FRESNO, CA	-6.9	39.2
GRAND JUNCTION, CO	-8.3	17.7	CARIBOU, ME	-6.3	4.1
MARYSVILLE/YUBA CO, CA	-8.2	37.9	SALT LAKE CITY, UT	-6.2	22.9
MASSENA, NY	-7.9	6.4	OAKLAND, CA	-6.2	43.1
BAKERSFIELD, CA	-7.8	41.0	KINGSVILLE NAS, TX	-6.0	60.7
CALIENTE, NV	-7.6	25.3			

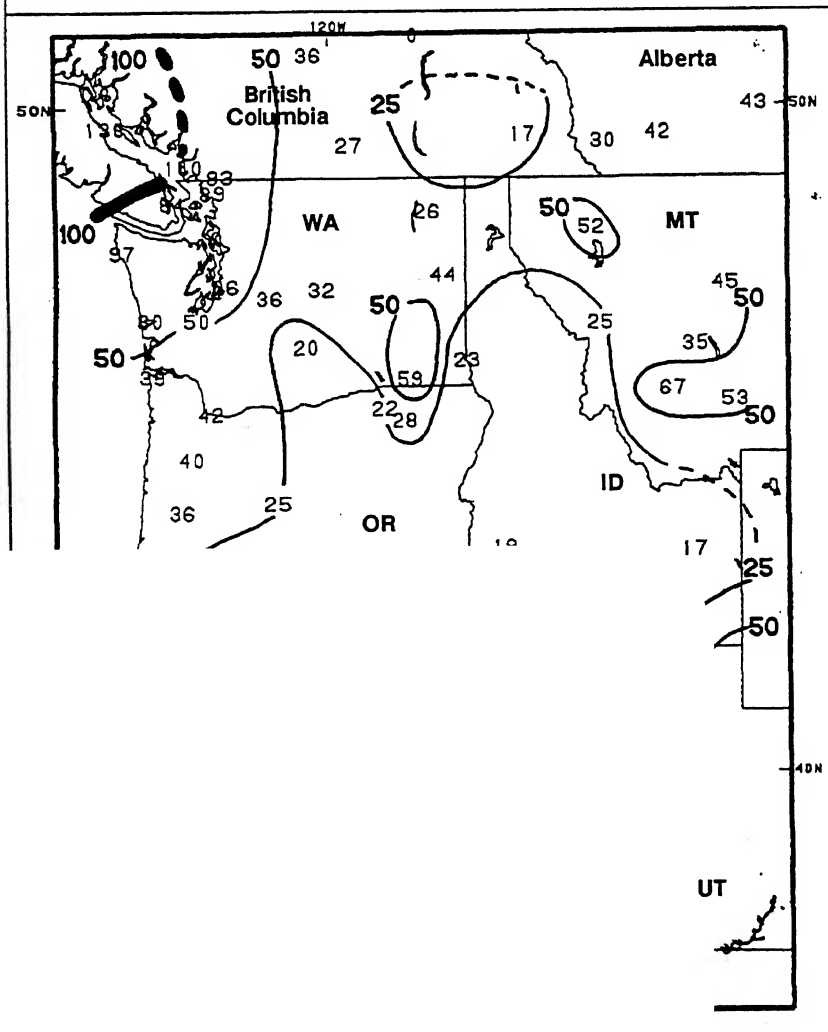
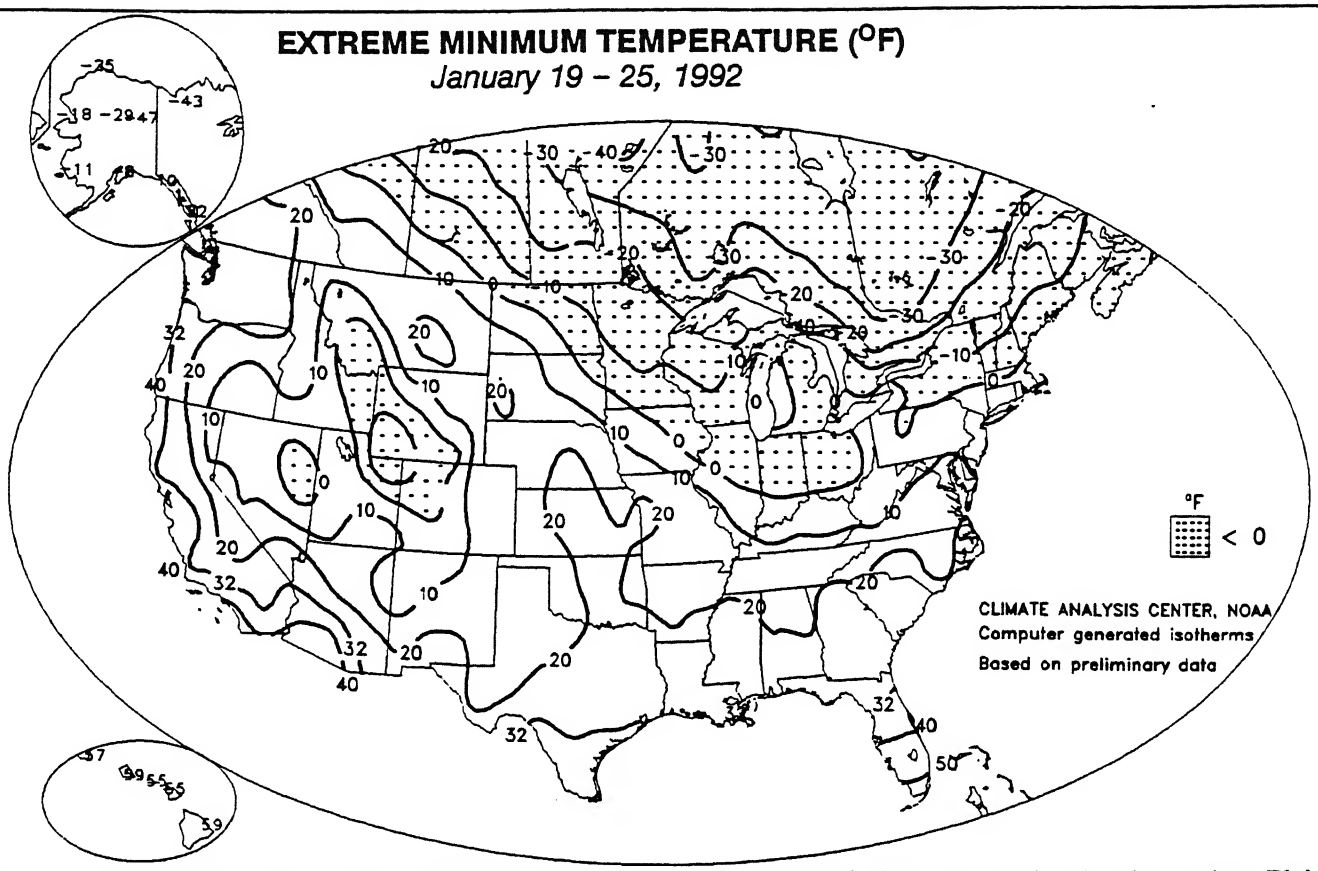


FIGURE 1. Percent of Normal Precipitation during December 22, 1991 - January 25, 1992 [35 days]. At least 34 days were required for inclusion. Isopleths drawn only for 100%, 50%, and 25%. *While abnormally heavy rains have moistened typically arid and semi-arid sections of southern California, southern Nevada, and western Arizona, deficient precipitation has aggravated long-term dryness across much of the western third of the United States. The majority of the region has received less than half of normal amounts since late December, with a large portion of the interior Far West from the northern Great Basin northward through much of Oregon and the northern Intermountain West measuring less than one-quarter of normal totals. Split flow in the upper levels of the atmosphere, typical across the eastern Pacific Ocean and North America during low-index (warm) ENSO episodes, has steered moisture either northward into western Canada or southward across southern California and the desert Southwest.*

EXTREME MINIMUM TEMPERATURE (°F)

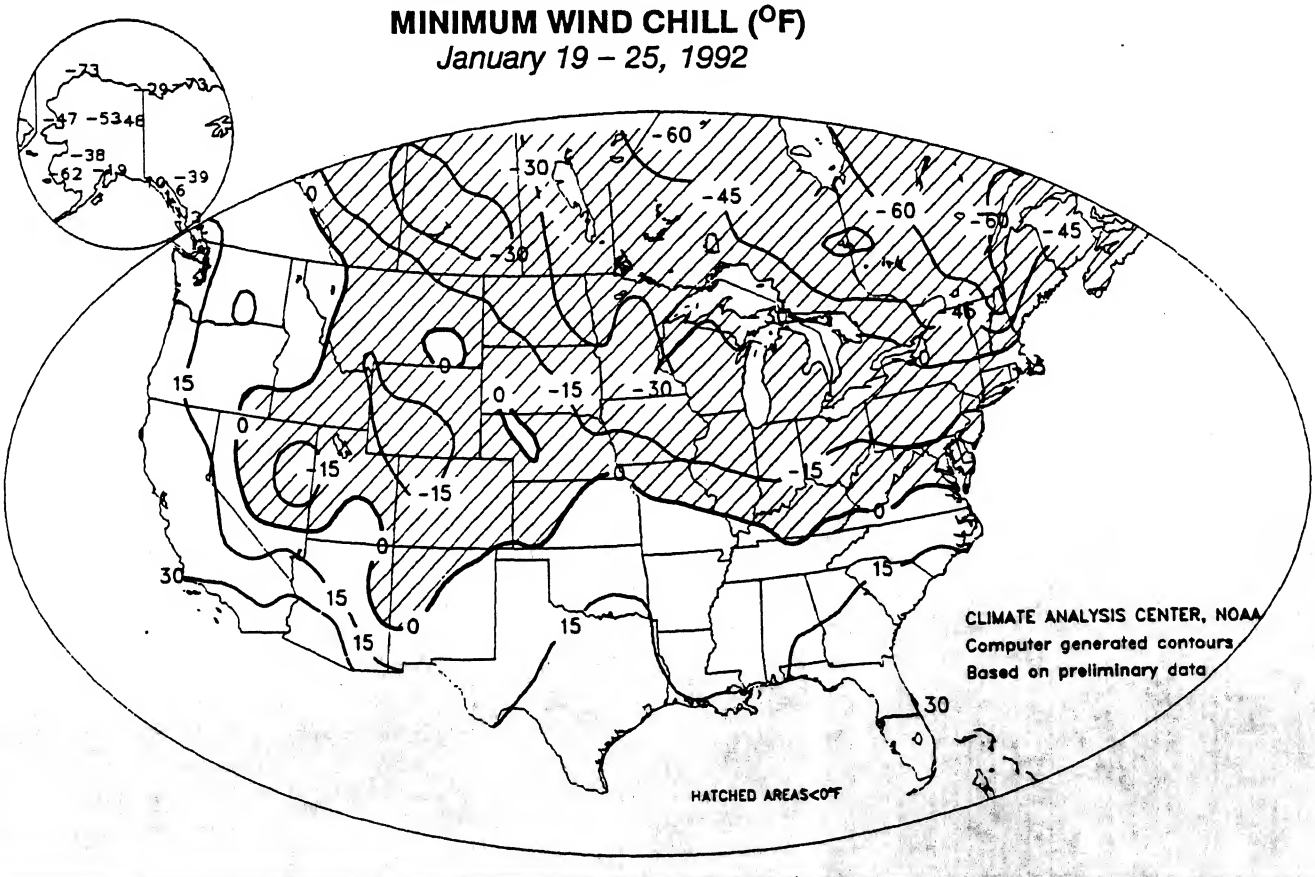
January 19 – 25, 1992



Subfreezing readings again covered most of the country, but bitterly cold weather (< 0°F) was restricted to the northern Plains, upper Midwest, Great Lakes, Ohio Valley, New England, and higher elevations of the Rockies (top). Gusty winds, however, brought subzero wind chills to much of the northern and central U.S., with readings below –30°F gripping the northern Great Plains and Great Lakes as well as New England (bottom).

MINIMUM WIND CHILL (°F)

January 19 – 25, 1992



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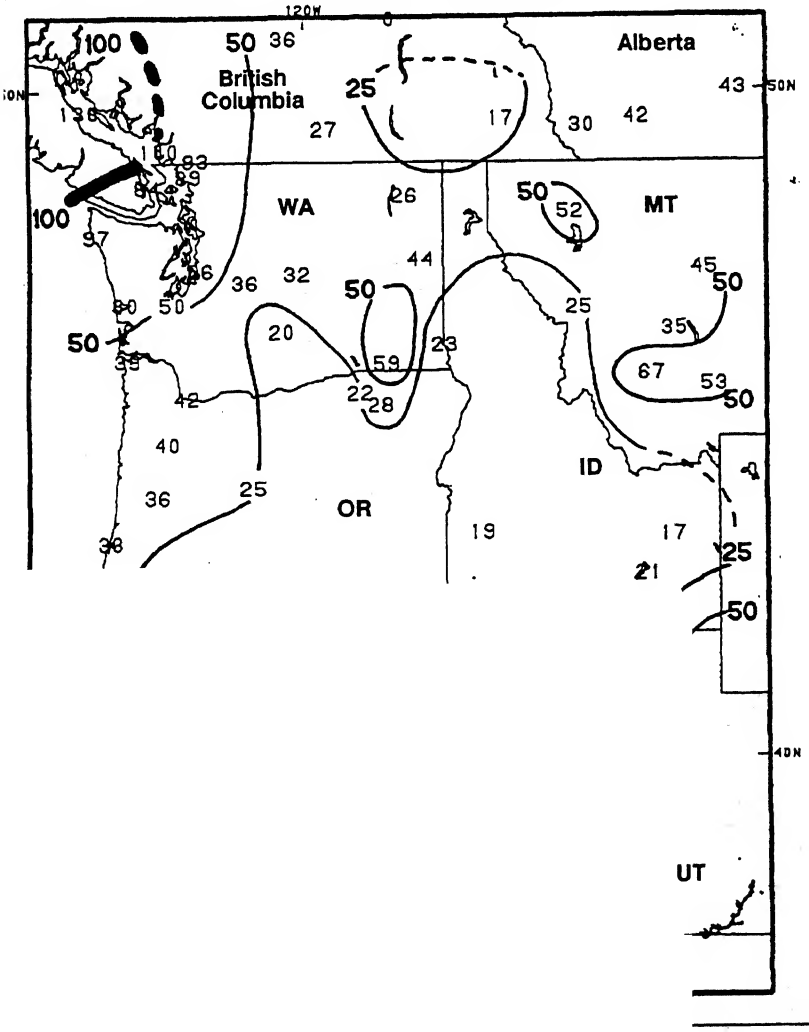
MASSENA, NY	-7.9	6.4	OAKLAND, CA	-6.2	43.1
BAKERSFIELD, CA	-7.8	41.0	KINGSVILLE NAS, TX	-6.0	60.7
CALIENTE, NV	-7.6	25.3			



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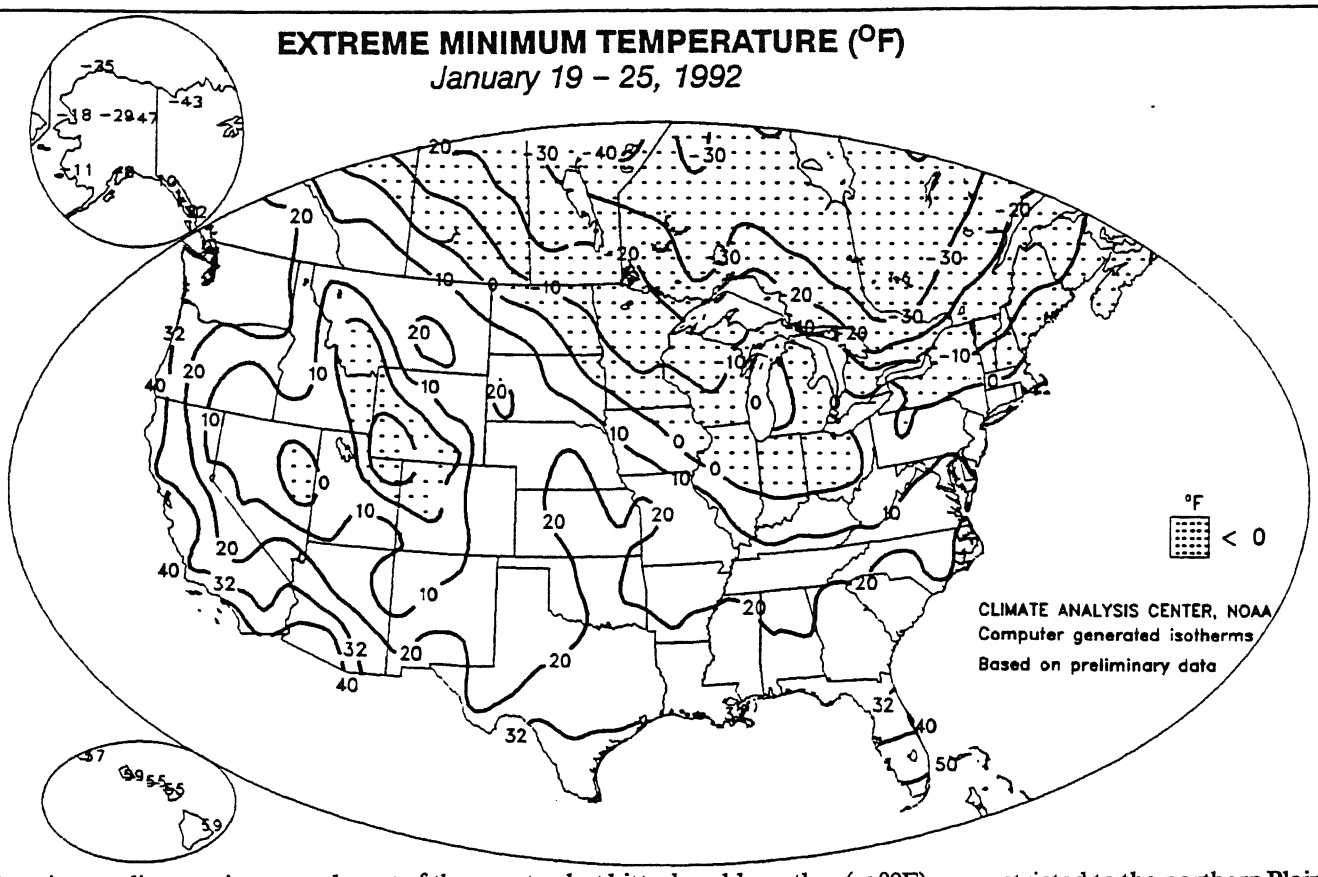
EXTREME MINIMUM TEMPERATURE (°F)

January 19 – 25, 1992



Subfreezing readings again covered most of the country, but bitterly cold weather (< 0°F) was restricted to the northern Plains, upper Midwest, Great Lakes, Ohio Valley, New England, and higher elevations of the Rockies (top). Gusty winds, however, brought subzero wind chills to much of the northern and central U.S., with readings below –30°F gripping the northern Great Plains and Great Lakes as well as New England (bottom).

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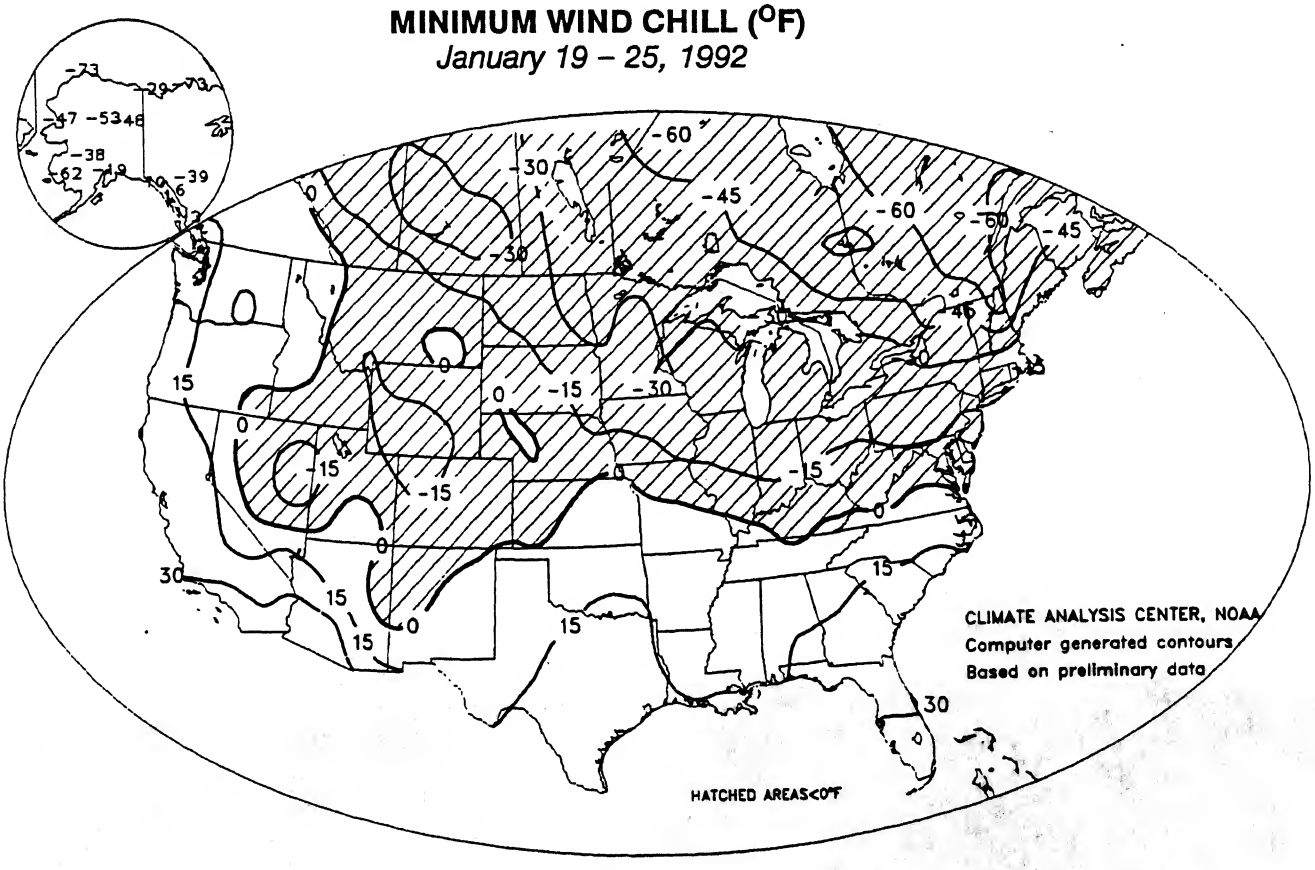
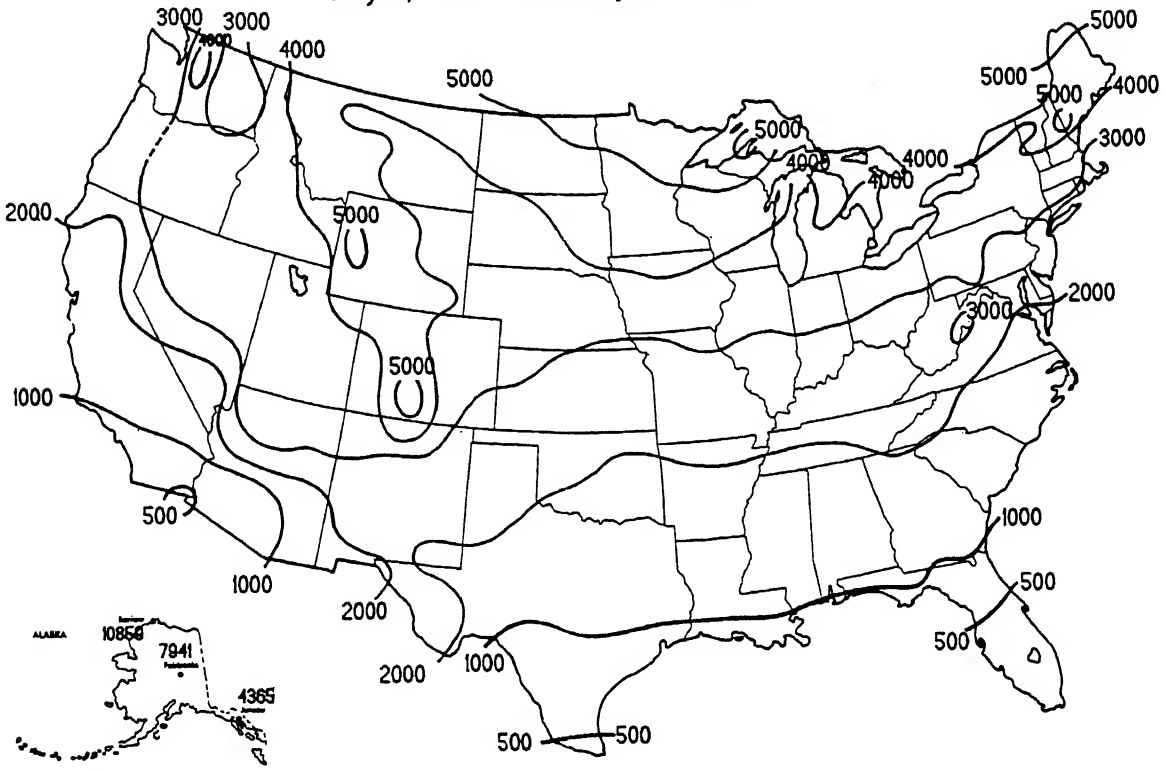


TOTAL HEATING DEGREE DAYS

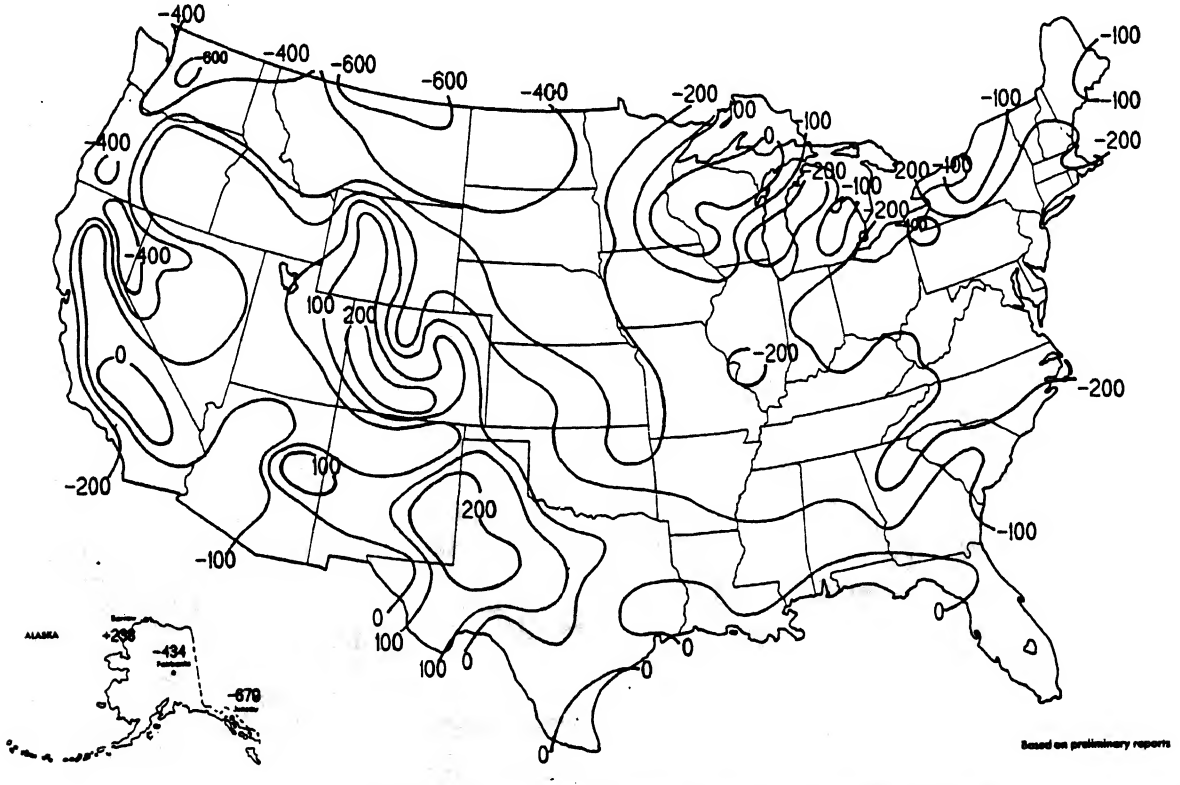
July 1, 1991 – January 25, 1992



More than 4000 HDD's have accumulated across much of New England, the north-central states, and the higher elevations of the Rockies and Washington Cascades, indicating significant but below normal heating usage (top). Primarily mild conditions since early December have generated below normal heating demand across most of the northern and eastern U.S., where Arctic outbreaks during October and November had created above normal seasonal HDD totals through mid-November (bottom).

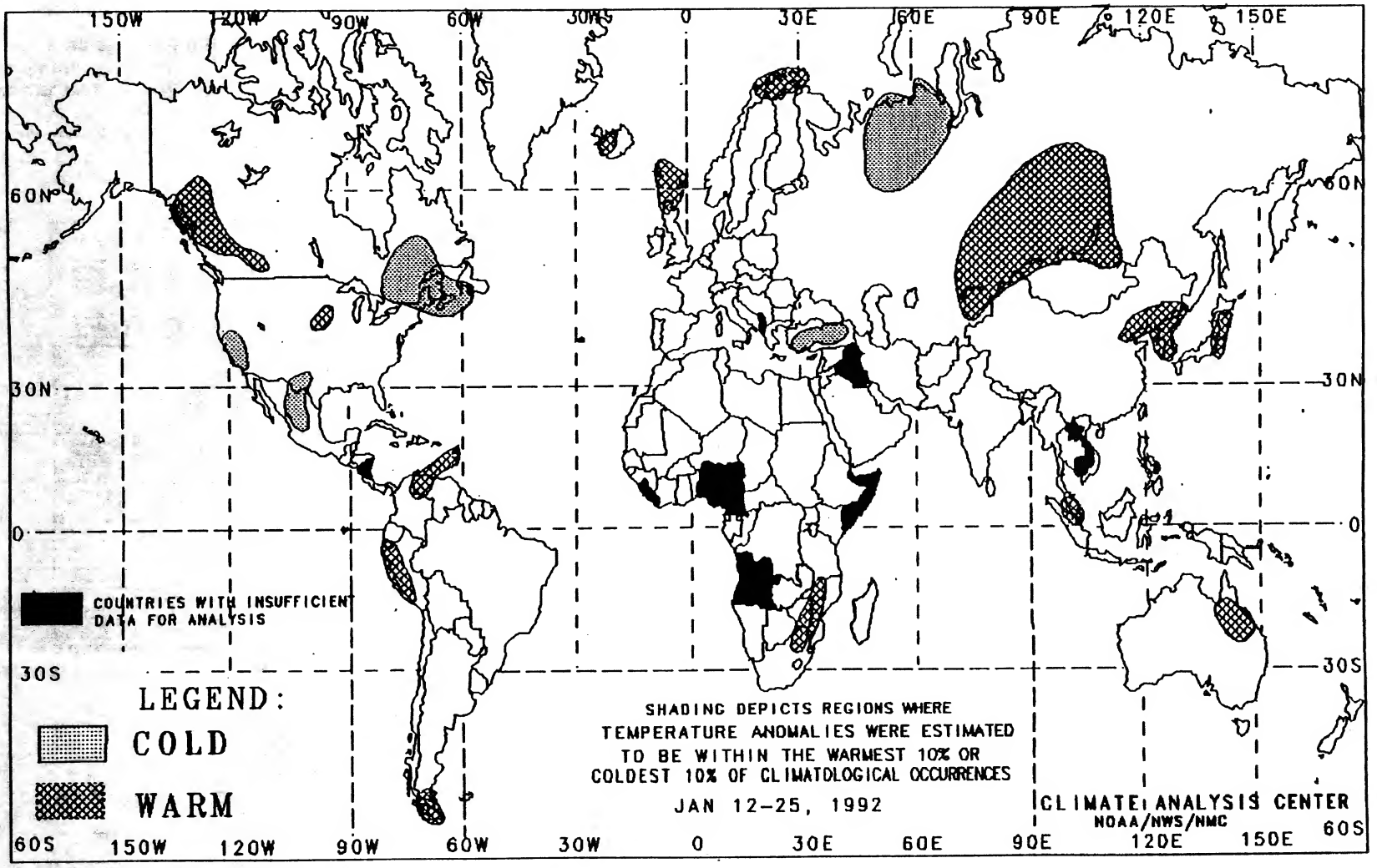
DEPARTURE FROM NORMAL HDD

July 1, 1991 – January 25, 1992



2–WEEK GLOBAL TEMPERATURE ANOMALIES

JANUARY 12 – 25, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

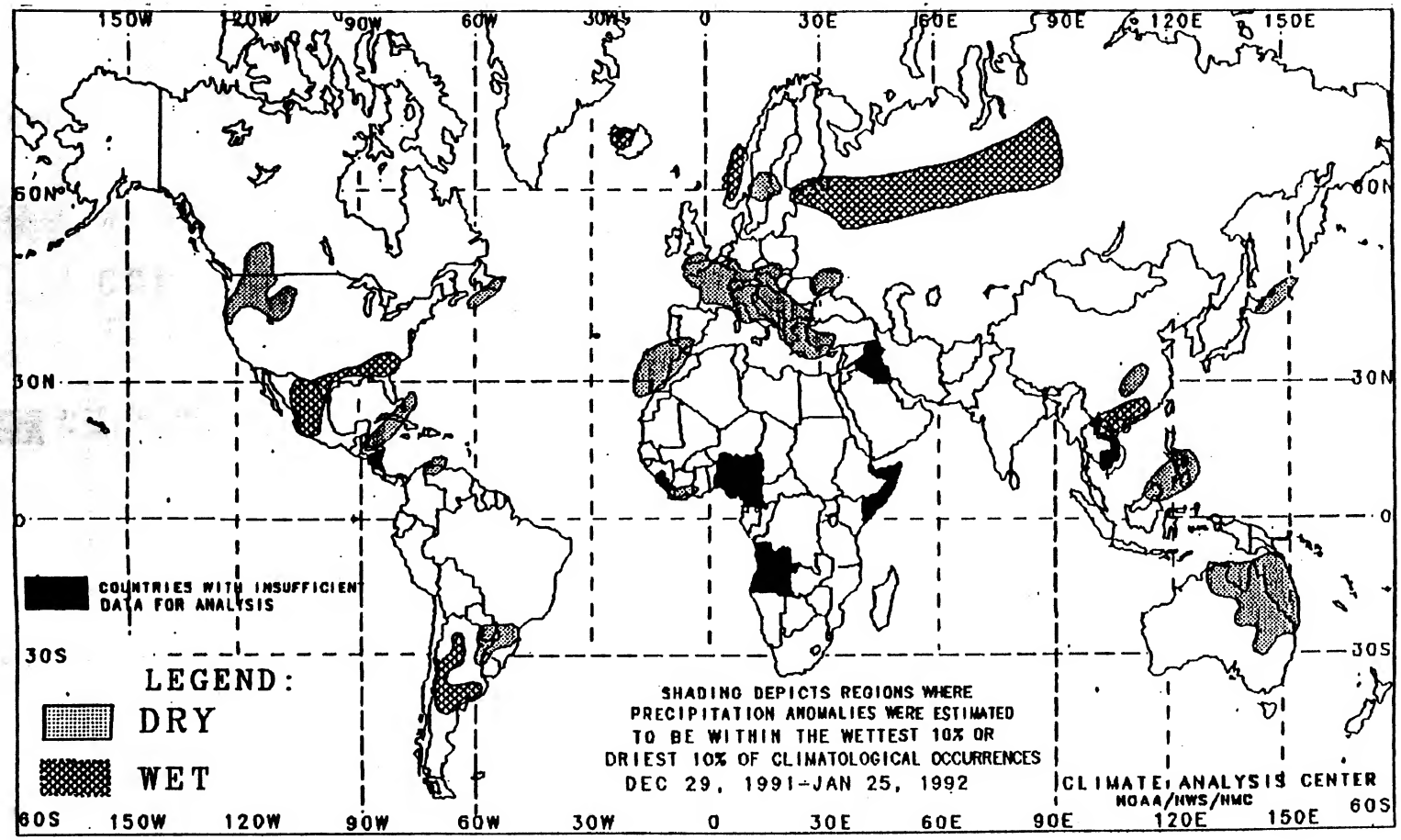
Temperature anomalies are not depicted unless the magnitude of ıperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4–WEEK GLOBAL PRECIPITATION ANOMALIES

DECEMBER 29, 1991 – JANUARY 25, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

ANNUAL CLIMATE SUMMARY

MAJOR CLIMATIC EVENTS AND ANOMALIES AROUND THE WORLD DURING 1991

1. Eastern Asia:

VARIABLE PRECIPITATION THROUGHOUT THE YEAR.

Precipitation in much of eastern Asia was highly variable during 1991. Exceptionally dry weather marked the beginning of the year, except for copious rains in northern Borneo during early February and Typhoon Sharon's trek across southern Luzon and northern Mindanao in March. A prolonged dry spell in the Philippines finally ended during April. Meanwhile, persistent wetness prevailed across Japan and eastern China through March and April. In May, the aforementioned pattern reversed and the anomalies disappeared, but abnormally dry conditions developed across Taiwan, Luzon, and southeastern China during May and June while heavy rains drenched northeastern China. Typhoon Yunya smashed into southern Luzon, but the remainder of the Philippines became dry again during mid-June. Soaking rains, with severe flooding, drenched southwestern Japan, South Korea, and the Yangzte River Valley of China during early and middle July. Relief in late July was short-lived as more storms pounded the region. The heavy rains along the Chinese coast and through Japan and Korea persisted throughout August while several typhoons battered the Philippines and the Indochina Peninsula. A sharp change in the pattern resulted in very dry weather across northeastern China while typhoons, heavy rains, and flooding plagued southern China and the Indochina Peninsula. Beginning in mid-August, a series of typhoons began affecting Japan, the Ryukyus, and Taiwan. By late September, six tropical cyclones had directly affected Japan; the latest, Typhoon Mireille, wrought more damage then any storm since 1971, according to press reports. The Philippines also endured several typhoons as November wore on. Tropical showers in the Philippines finally eased in early December.

2. North America:

PERIODS OF WARM AND DRY WEATHER.

The West Coast endured its fifth consecutive rainy season with abnormally dry weather during 1990–91. January and February brought exceptionally low precipitation totals before the "March Miracle," which contained the heaviest precipitation in five years, soaked California. These rains and snows brought significant relief to the region, but were not nearly enough to counteract five years of drought. Near normal conditions prevailed in late April and most of May but then an early season heat-wave engulfed much of the continent. A hot, dry summer ensued in most areas as the Corn Belt and mid-Atlantic became especially parched. Widespread but spotty rains provided limited relief in the Corn Belt during early August, but it took Hurricane Bob to break the dry spell in the Northeast. A cold snap in September signaled the end of the warm, dry weather but not before the area from eastern Ohio to Maryland experienced severe to extreme drought. In addition, very dry autumn weather in the central and southern Appalachians and Piedmont, particularly in West Virginia, aided wildfire conditions. The wet season along the West Coast started late, and during October, numerous wildfires scorched the western forests and caused severe damage and loss of lives near Oakland, CA. Several Arctic outbreaks and record-breaking snows in the north-central United States signaled the end of the warm, dry weather that had persisted for eleven months. Overall, however, it should be noted that some parts of the afflicted region experienced a very wet year, particularly the western Great Lakes, northern Plains, and Gulf Coast.

3. Northern and Eastern Australia:

WET EARLY IN THE YEAR, THEN VERY DRY.

Cyclone Joy set the stage for almost two months of excessively heavy rain in northern Australia, which finally ended in early March. By late March, however, moisture deficits were widespread as the Australian wet season came to a premature end. In September, the approach of spring failed to bring the typical increase in rain as sizable moisture deficits expanded across most of eastern Australia. A brief respite in early November failed to eliminate moisture deficits, but heavy rains soaked the northern areas in late November. Moderate rains during December ended the short-term moisture deficits, but he rainy season as a whole remained abnormally dry. The slow start to the 1991–92 wet season correlates well with the typical low-index (warm) El-Nino Southern Oscillation (ENSO) precipitation signal in the region.

4. Europe and the Middle East:

DRY WINTER, WET SPRING.

Short-term dryness was widespread across eastern Europe and the Middle East as the year began. Bitterly cold air invaded the continent during late January and early February as heavy snow blanketed many areas. When the cold snap eased, however, precipitation deficits remained. In early March, beneficial rains had commenced, diminishing the dry spell. Late season rains drenched the Middle East and southeastern Eu throughout April and May, then drier, more ty weather returned in June.

5. Central and Eastern Sou[illegible]

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7. West-Central Africa and the Sahel:

WET, THEN DRY.

The wet season commenced early across much of west-central Africa as cool, rainy conditions persisted in May. By June, warmer and slightly drier weather was observed, and the rains diminished as the month progressed. Pockets of dryness showed up in early July, but some mid-July rains brought limited relief. Dryness was limited to northern Senegal and southwestern Mauritania during August, but moderate rains in early September ended the dry spell.

8. Indonesia and Malaysia:

DRYNESS ENGENDERS LARGE WILDFIRES.

Exceptionally dry conditions commenced during the late Spring across Indonesia and persisted into October, creating ideal conditions for extensive wildfires in the western half of the country. Spotty rains in late October and most of November provided limited relief, and more general moderate to heavy rainfall alleviated the dryness by the middle of December. This anomaly pattern is consistent with the typical low-index (warm) ENSO response in the region.

9. Europe, Northern Africa, and the Western Middle East:

COLD WAVE BLASTS REGION.

A late April cold wave invaded much of Europe after unusual March warmth and caused considerable crop damage. Cold and damp weather throughout May hampered the growth of surviving crops. The widespread chill shifted southeastward during June and more seasonable temperatures failed to return until the end of the month. The same southeastern areas were again afflicted by cold and wet weather in December.

10. Alaska, Northwestern Canada, and Eastern Siberia:

LATE SPRING AND EARLY SUMMER HEAT WAVE.

Mild weather engulfed northern Alaska and northwestern Canada during May. The mild and dry weather promoted wildfires in Alaska. After a brief spell of chilly weather in June, hot weather resumed and spread across all of northwestern North America and well into eastern Siberia. Cooler air moved into Alaska by mid-July, and ended the heat wave by spreading into eastern Siberia.

11. Sri Lanka and Southern India:

VERY WET MONSOON SEASON.

A strong 1991 monsoon season was observed as heavy rains inundated Sri Lanka and much of southwestern India. The deluging rainfall brought widespread flooding and landslides in the middle of June. The rains persisted throughout July and finally spread into northwestern and central India where moisture deficits had developed.

12. Western Siberia and Northwestern and Central Europe:

WARM AND DRY DURING LATE SUMMER.

Abnormal dryness spread across Europe during August, and high temperatures aggravated conditions in early September. Widespread rains eased the dryness at the end of September, but unseasonably high temperatures persisted well into October. A sharp cold wave in late October abruptly ended the warm spell.

13. Western India and Central Pakistan:

MONSOON SEASON IS VERY DRY.

Little or no rainfall into August resulted in large moisture deficits across central Pakistan and extreme western India. Some rains fell late in the month, but relief was short-lived, however, as the monsoon season ended early. Most areas received less than 75% of normal rainfall totals.

14. Western and Northern United States and Southern Canada:

BITTER COLD MARKS BEGINNING OF YEAR.

Arctic air chilled the Intermountain West during early January and spread into the central states and Canada. By the end of the month, the cold air had retreated into southeastern Canada, where it remained entrenched until the middle of February.

15. New Lands of Russia and Kazakhistan:

EARLY SUMMER DRY SPELL.

Hot, dry weather affected crops across the New Lands region during June. Although cooler weather returned rather quickly, the area remained unfavorably dry until beneficial rains brought relief in mid-July.

16. Central Mexico:

WIDESPREAD FLOODING FROM HEAVY RAINS.

Soaking rains in late June and most of July plagued the region, and extensive flooding was reported. Near normal conditions returned during August.

17. Western and Central Sahel:

ANOMALOUSLY HIGH TEMPERATURES DURING MARCH.

The month of March was exceptionally warm across the region, with the largest weekly temperature departures approaching +3°C in northern Burkina Faso and southern portions of Mali and Niger.

18. New Zealand:

PROLONGED WETNESS OBSERVED.

Very heavy precipitation drenched much of New Zealand from late July to early September. Drier conditions returned as September progressed.

19. Bangladesh:

TYPHOON DECIMATES REGION.

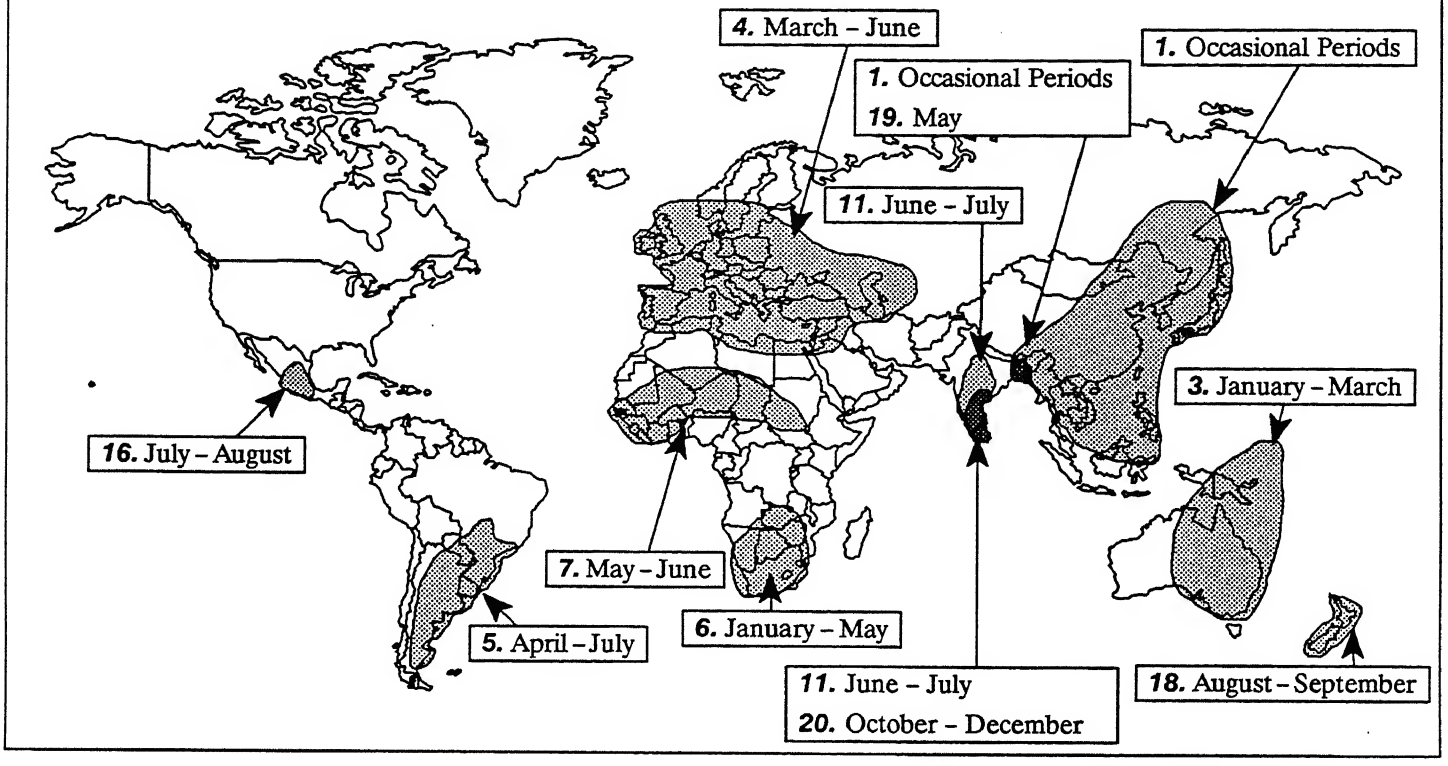
In late April, a devastating typhoon swept across the country as waves of six meters in height were whipped up by 270 kph winds, taking over 139,000 lives according to reports. Sporadic heavy rains throughout May hampered rescue and recovery operations.

20. Sri Lanka and Southern India:

TROPICAL CYCLONE UNLEASHES HEAVY RAIN.

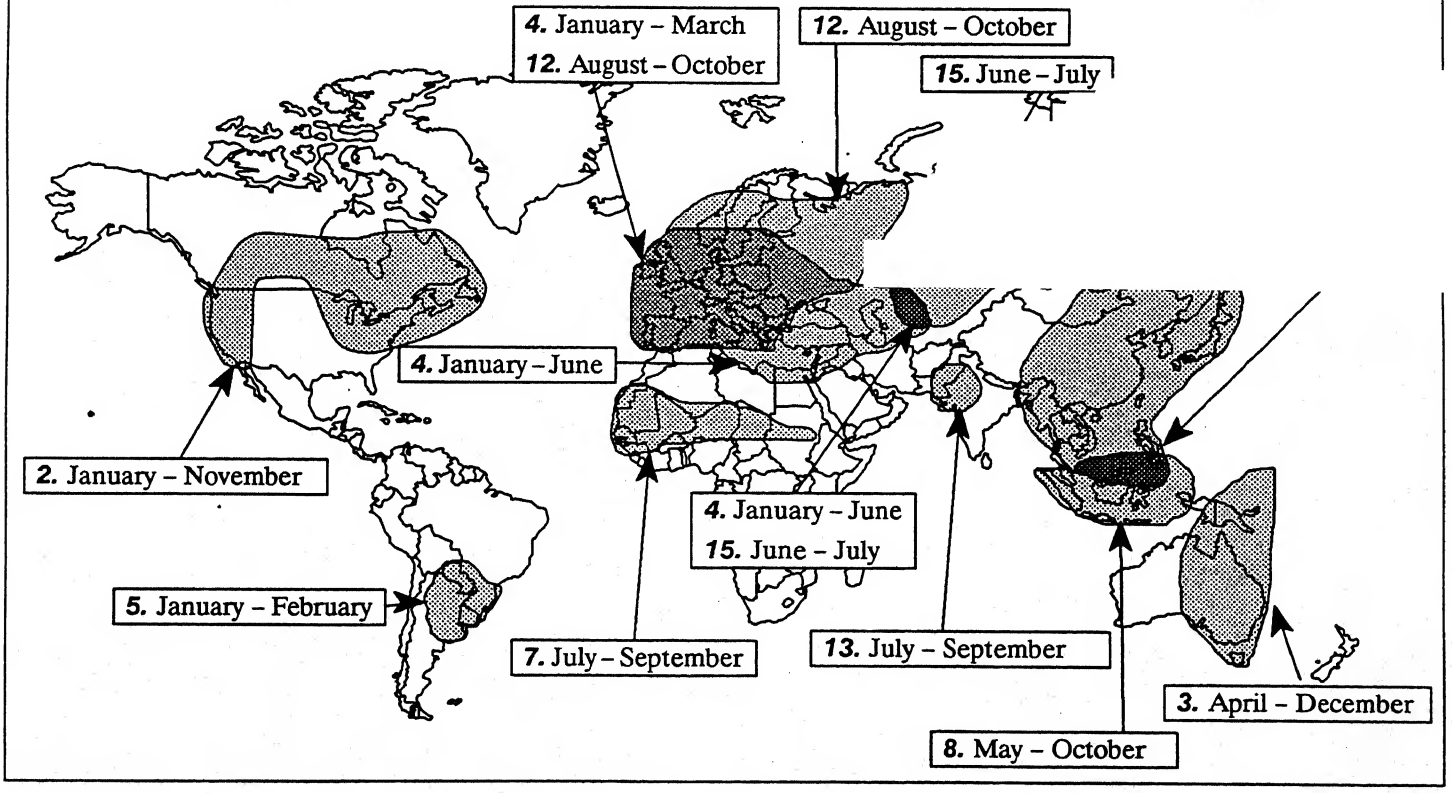
Following a wet monsoon season, Tropical Storm 4B, packing winds over 100 kph, dumped as much as 580 mm on parts of Sri Lanka and southern India in mid-November. Several weeks of wet weather before and after the system's landfall brought rainfall total during late October to early December to over 700 mm at some locations.

SIGNIFICANT ABOVE NORMAL PRECIPITATION ANOMALIES DURING 1991

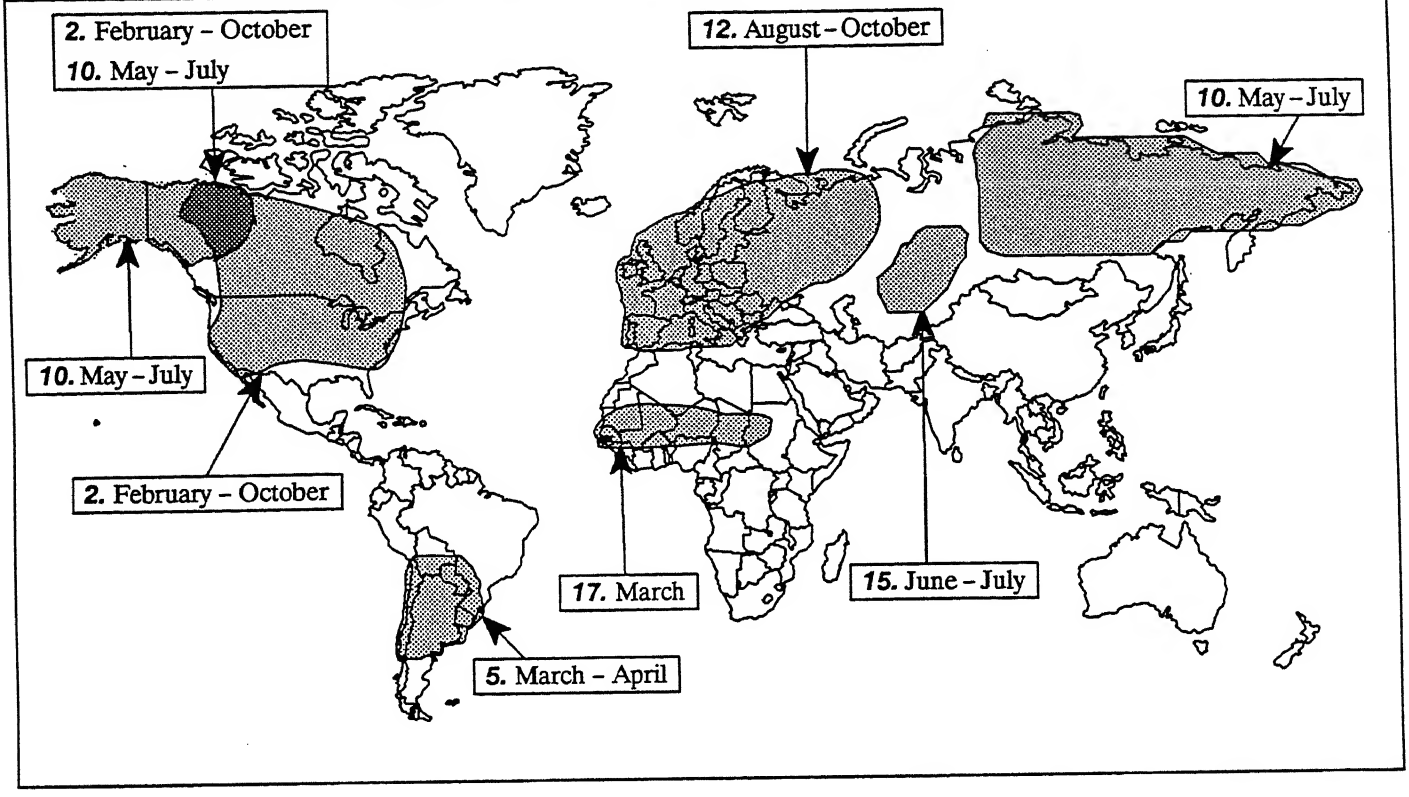


Numbers refer to specific items in the Annual Climate Summary text.

SIGNIFICANT BELOW NORMAL PRECIPITATION ANOMALIES DURING 1991



SIGNIFICANT ABOVE NORMAL TEMPERATURE ANOMALIES DURING 1991



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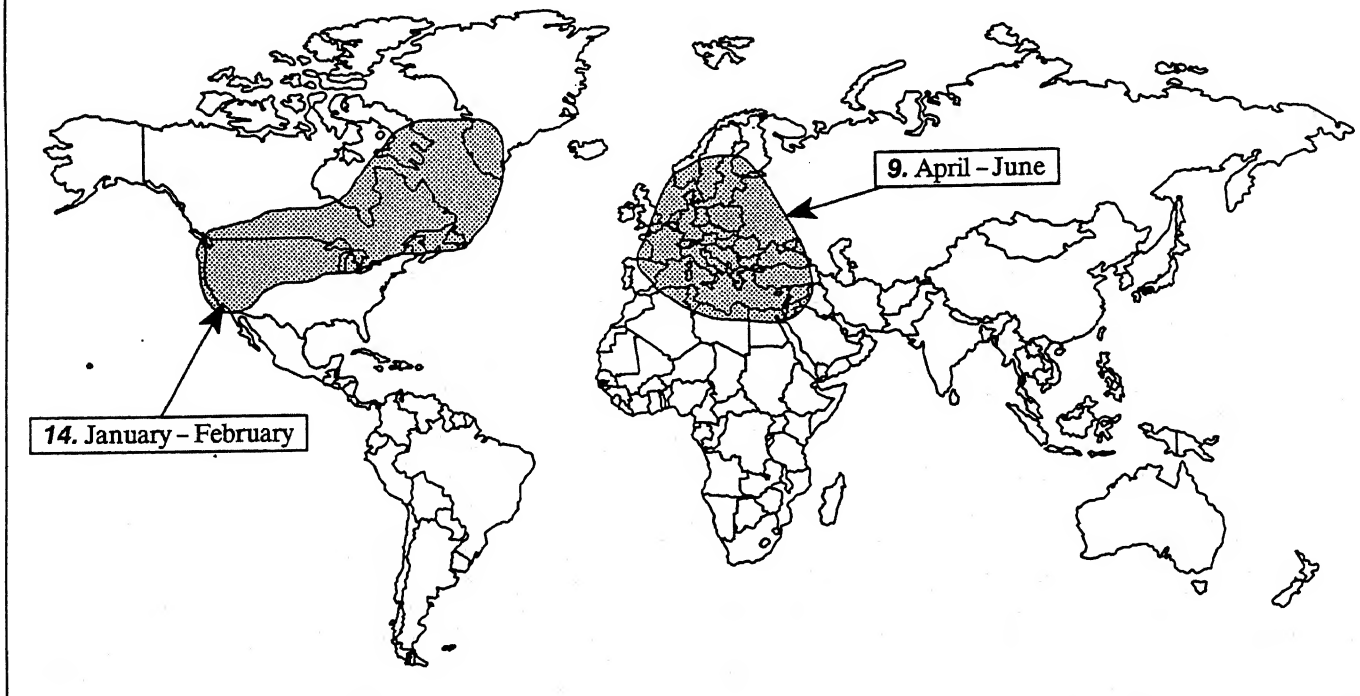
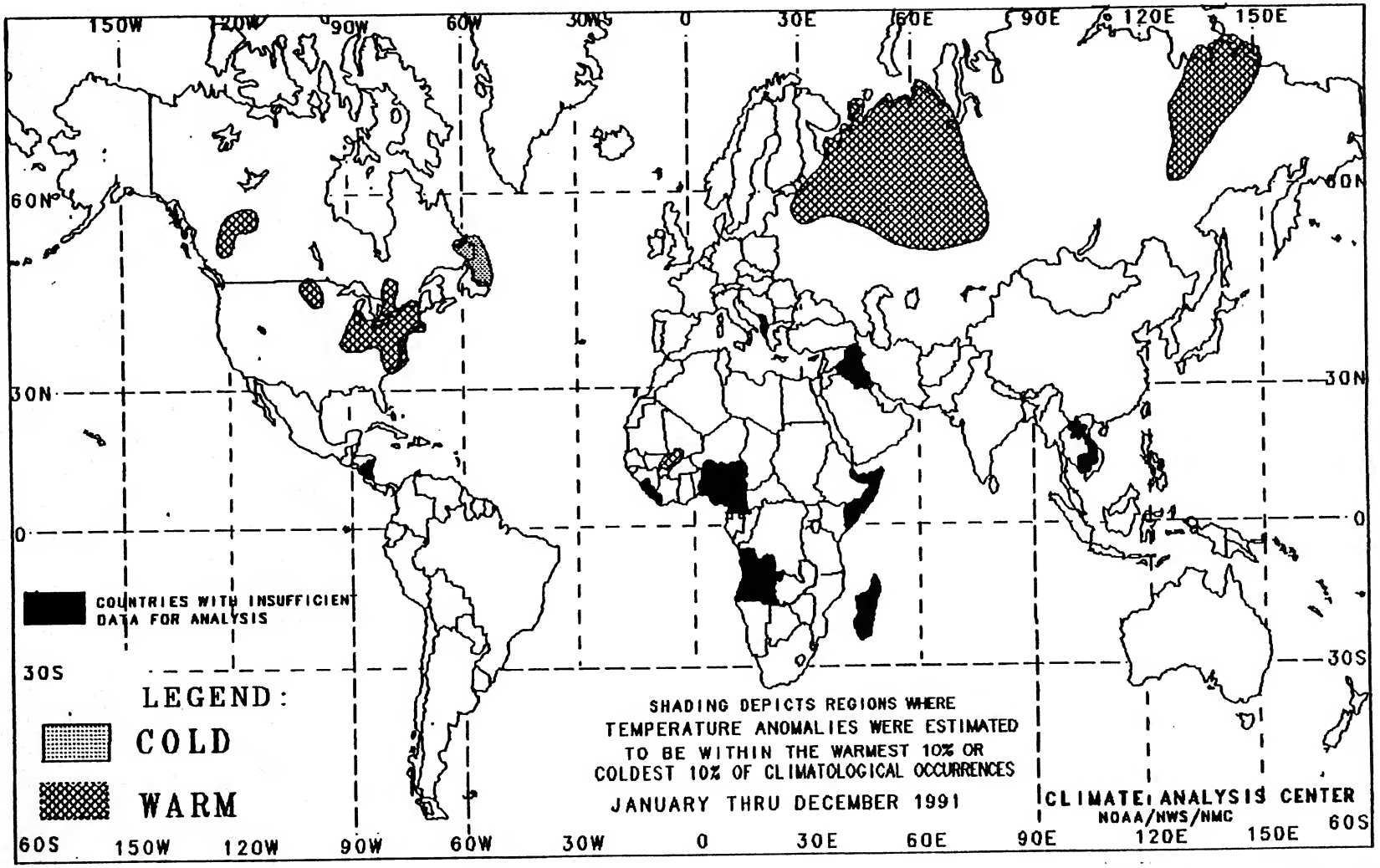


ANNUAL GLOBAL TEMPERATURE ANOMALIES

JANUARY – DECEMBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 78 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have reulted in an overestimation of the extent of some warm anomalies.

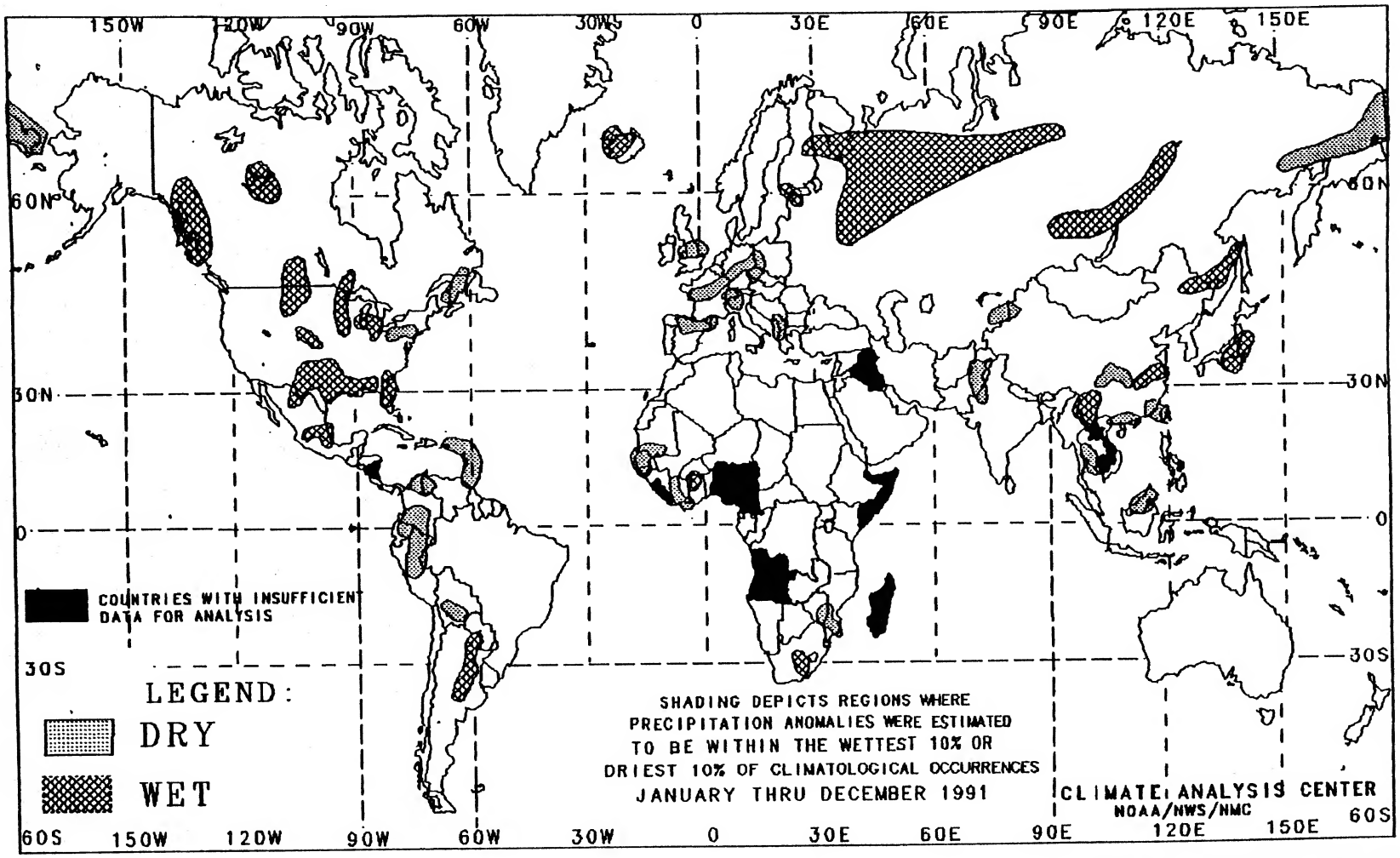
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

ANNUAL GLOBAL PRECIPITATION ANOMALIES

JANUARY – DECEMBER 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 350 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the twelve month period is less than 100 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total twelve month precipitation exceeds 250 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of twelve month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.


DEPARTMENT OF COMMERCE
UNITED STATES OF AMERICA